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32566	7590	11/22/2005	EXAMINER	
PATENT LAW GROUP LLP			CHOW, JEFFREY J	
2635 NORTH FIRST STREET				
SUITE 223			ART UNIT	
SAN JOSE, CA 95134			PAPER NUMBER	
			2672	

DATE MAILED: 11/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/614,876

Applicant(s)

CAO ET AL.

Examiner

Jeffrey J. Chow

Art Unit

2672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION*****Drawings*****INFORMATION ON HOW TO EFFECT DRAWING CHANGES****Replacement Drawing Sheets**

Drawing changes must be made by presenting replacement sheets which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments section, or remarks, section of the amendment paper. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). A replacement sheet must include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and within the top margin.

**Annotated Drawing Sheets**

A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be submitted or required by the examiner. The annotated drawing sheet(s) must be clearly labeled as "Annotated Sheet" and must be presented in the amendment or remarks section that explains the change(s) to the drawings.

**Timing of Corrections**

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDONMENT of the application.

If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings MUST be filed within the THREE MONTH shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability.

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The drawings are objected to under 37 CFR 1.83(a) because they fail to show the decision blocks, not limit to, reference numbers 120, 124, and 202 as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Suggestion is made to change these blocks to decision blocks and clearly state what the decision is and clearly state the options of each path.

The drawings are objected to under 37 CFR 1.83(a) because they fail to show the scenario first found in, not limited to, reference number, not limited to, 208 of when  $dx = 0$  as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).

The drawings are objected to under 37 CFR 1.83(a) because they fail to show inflection point and methods of determining inflection point for Bezier curve as claimed in claims 4 and 12. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).

### *Specification*

Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because it is essentially a repeat of claim 5 and not in narrative form and does not describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. Correction is required. See MPEP § 608.01(b).

**Content of Specification**

- (g) **Brief Summary of the Invention:** See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

The disclosure is objected to because of the following informalities: The summary is not separate and distinct from the abstract. The summary does not point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention) as stated above.

The disclosure is objected to because of the following informalities: The scenario of when  $dx = 0$  is not described first found in, not limited to, paragraph 39.

The disclosure is objected to because of the following informalities: The area of the triangle stated in paragraph 86 is incorrect.

The disclosure is objected because it inadequately describes the method and the use of inflection point for Bezier claimed as mentioned in claims 4 and 12. No new matter is allowed.

The disclosure is objected because equation (12) is incorrect partial derivative of equation (11).

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

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The use of the trademark Macromedia Flash has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

### ***Claim Objections***

Claims 5 – 10 are objected to because of the following informalities: The use of “(1)” and “(2)” for small intermediate steps of the claim that are not recited later in the claims should be deleted as it provides confusion in understanding the claimed invention. Appropriate correction is required.

Claims 3 and 11 are objected to because of the following informalities: “original” is misspelled in the third line of the claims.

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1 – 12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The disclosed invention does not perform independent physical acts (post-computer process activity), manipulate data representing physical objects, nor manipulate activities to achieve a practical application (pre-computer process activity). The disclosed invention merely manipulates abstract idea or solve a purely mathematical problem without any limitation to a practical application.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 3, and 5 – 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kai in view of Foley.

Regarding to independent claim 1 and dependent claim 2, Kai discloses a flow chart (FIG. 2) of an apparatus that can make an nth-order Bezier curve by these following steps (Column 4, lines 25 – 67, and FIG. 2, 3, and 15): “(a) First, the stack memory 13 is cleared. (b) Coordinate values (x, y) of control points P0 to Pn of a Bezier curve are set in the register 11. (c) The determination circuit 14 determines whether the Bezier curve can be subdivided further. (d)



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If YES in step (c), a data representing the distance between adjacent control points set in the register 11 is bisected into two parts by the bisection circuit 12. (e) One of first- and second-halves (second half, in this case) of the Bezier curve data formed by subdivision is pushed into the stack memory 13. (f) The other divided half data (first half, in this case) is returned to the register 11, and the operation is repeated from step (c). (g) If the set of the control points of updated Bezier curve cannot be further subdivided, the contents of the register 11 are read out as coordinate point data representing a parameter curve to be obtained. (h) Whether the stack memory 13 is empty is checked. If the stack memory 13 is empty, the operation is ended. (i) If the stack memory 13 is not empty, the contents of the stack memory 13 are popped into the register 11, and the operation is repeated from step (c). The determination circuit 14 may adopt various systems as will be described later. In accordance with the type of system, processing is performed for the contents of the register 11 read out in step (f) or (i). In the case of a determining system in which subdivision is continuously performed until a subdivision result becomes two adjacent points on a bit map, instead of outputting the contents of the register 11 in step (g), only a coordinate difference between a present control point and an immediately preceding point may be output.” Kai does disclose a flatness test by taking the distance between the midpoints of P0 and P1 and the midpoints of P2 and P3 and compare it to a threshold value (Column 13, lines 1 – 5 and FIG. 13), but does not disclose a flatness test by taking the area of a triangle, made by the two anchor points and the control points, and dividing it by the distance between the control points. It is well known in the art at the time of the invention that a quadratic Bezier curve is a 2<sup>nd</sup> order Bezier curve. Foley discloses a flatness test of comparing d2 and d3 (Foley) with a threshold value, where d2 and d3 (Foley) are heights of the triangle P1, P2, and P4 and the triangle P1, P3, and P4, respectively, where P1 and P4 are anchor points and

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P2 and P3 are control points (Foley, pg 513, 514 and FIG. 11.38). It is well known in the art at the time of the invention that the area of a triangle divided by its base (distance between the anchor points) is  $\frac{1}{2}$  the height. Since the quotient is being compared by a threshold value, the coefficient  $\frac{1}{2}$  can be factor into the threshold value and be a new threshold value or just a number that declares a threshold value.

$$\text{Area of Triangle} = \frac{1}{2} b * h$$

$$\text{Area of Triangle} = S(a1, c, a2)$$

$$F(a1, c, a2) = S(a1, c, a1) / |a1 a2|$$

$$F(a1, c, a2) \approx \text{Area of Triangle} / b$$

$$F(a1, c, a2) \approx \frac{1}{2} h$$

$$2 * F(a1, c, a2) \approx h$$

$2 * F(a1, c, a2)$  is just another threshold value.

It would have been obvious to one of ordinary skills in the art at the time of the invention to combine Kai's system with Foley's teachings of a flatness test of comparing the height of the triangle to a threshold value in order to use less data and be more efficient in speed and processing time to decide whether or not to subdivide an n-th order Bezier curve.

Regarding to independent claim 5 and dependent claims 6 – 10, see Kai's system with Foley's teachings.

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Regarding to dependent claims 3 and 11, Kai discloses a system with a bisection circuit 12 that is used to determine if a Bezier curve needs to be bisected. Foley discloses a method that uses the height of triangles to determine the flatness of the Bezier curve.

In addition,

Given:

$\triangle ABC$

Point Y is the midpoint of AB

Point Z is the midpoint of BC

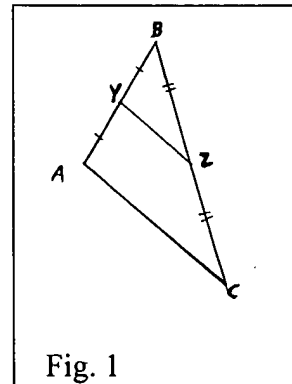
Therefore:

$BY = AY$

$BZ = CZ$

$BY = \frac{1}{2} AB$

$BZ = \frac{1}{2} BC$



BY and BZ are congruent to AB and BC, respectively, by  $\frac{1}{2}$

Therefore  $\triangle ABC$  is congruent to  $\triangle YBZ$  by SAS Postulate

Given:

$\triangle ABC$  is congruent to  $\triangle YBZ$  and

$BY = \frac{1}{2} AB$  and  $BZ = \frac{1}{2} BC$

Therefore:

$YZ = \frac{1}{2} AC$

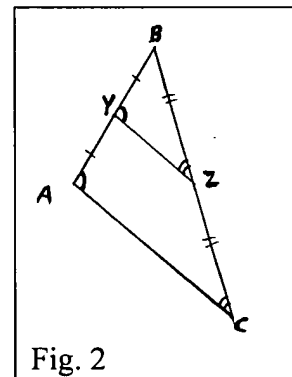
$\angle Y = \angle A$

$\angle Z = \angle C$

height of  $\triangle YBZ = \frac{1}{2}$  of height of  $\triangle ABC$

base of  $\triangle YBZ = \frac{1}{2}$  of base of  $\triangle ABC$

area of  $\triangle YBZ = \frac{1}{4}$  area of  $\triangle ABC$



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Given:

$$\text{area of } \triangle YBZ = \frac{1}{4} \text{ area of } \triangle ABC$$

Therefore

$$\text{area of Trapezoid } AYZC = \frac{3}{4} \text{ area of } \triangle ABC$$

Given:

$$\angle Y = \angle A$$

$$\angle Z = \angle C$$

Therefore:

$$YZ \parallel AC$$

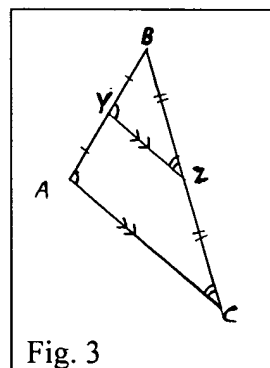


Fig. 3

Given:

E is the midpoint of YZ

Therefore:

$$YE = EZ$$

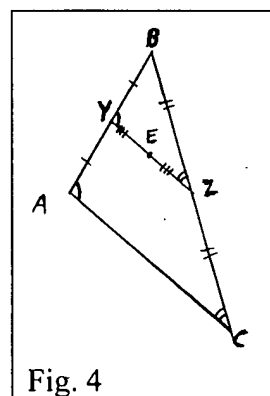


Fig. 4

If  $\triangle YBZ$  is copied into Trapezoid  $AYZC$  as shown in FIG. 5.

Then:

$Y'Z'$  fits right over  $AC$

because height of  $\triangle YBZ =$

height of Trapezoid  $AYZC$  and  $YZ \parallel AC$

$AY \parallel EY'$

because  $\angle Y' = \angle A$

$CZ \parallel EZ'$

because  $\angle Z' = \angle C$

$EY \parallel AY'$

$EZ \parallel CZ'$

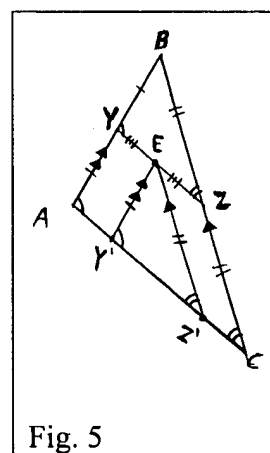


Fig. 5

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Given:

$$\begin{aligned} AY &|| EY' \\ EY &|| AY' \end{aligned}$$

Therefore:

$AYEY'$  is a parallelogram

Given:

$$\begin{aligned} CZ &|| EZ' \\ EZ &|| CZ' \end{aligned}$$

Therefore:

$CZYZ'$  is a parallelogram

Given:

$$\triangle YBZ = \triangle Y'EZ'$$

Therefore:

$$\text{area of } \triangle Y'EZ' = \frac{1}{4} \text{ area of } \triangle ABC$$

$$\text{sum of area of parallelograms } AYEY' \text{ and } CZYZ' = \frac{1}{2} \text{ area of } \triangle ABC$$

Given:

$$\begin{aligned} EY &= EZ \\ EY &|| AY' \\ EZ &|| CZ' \\ \text{height of parallelogram } AYEY' &= \\ \text{height of parallelogram } CZYZ' & \end{aligned}$$

Therefore:

$$\begin{aligned} AY' &= CZ' \\ \text{area of parallelogram } AYEY' &= \\ \text{area of parallelogram } CZYZ' &= \\ \text{area of parallelogram } AYEY' &= \\ \frac{1}{4} \text{ area of } \triangle ABC & \\ \text{area of parallelogram } CZYZ' &= \\ \frac{1}{4} \text{ area of } \triangle ABC & \end{aligned}$$

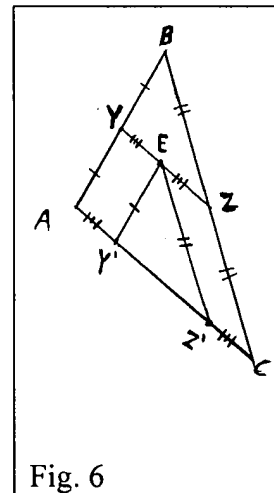


Fig. 6

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Given:

AE is a diagonal of parallelogram AYEY'

CE is a diagonal of parallelogram CZEZ'

area of parallelogram AYEY' =

 $\frac{1}{4}$  area of  $\triangle ABC$ 

area of parallelogram CZEZ' =

 $\frac{1}{4}$  area of  $\triangle ABC$ 

Therefore:

area of  $\triangle AEY$  = $\frac{1}{2}$  area of parallelogram AYEY'area of  $\triangle CEZ$  = $\frac{1}{2}$  area of parallelogram CZEZ'

Therefore

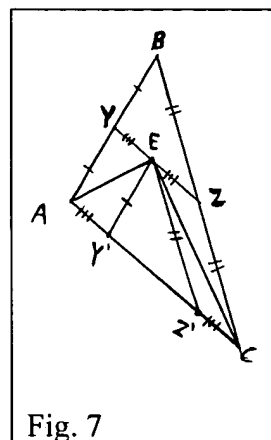
area of  $\triangle AEY$  =  $\frac{1}{8}$  area of  $\triangle ABC$ area of  $\triangle CEZ$  =  $\frac{1}{8}$  area of  $\triangle ABC$ 

Fig. 7

Therefore, it is inherent that triangles formed through bisection of the process stated in the disclosure are one-eighth the area of the original triangle. It would have been obvious to one of ordinary skills in the art at the time of the invention to utilize the above-mentioned geometrical analysis with Kai's system and Foley's teachings of a flatness test of comparing the height of the triangle to a threshold value in order to not recomputed the new divided area of the triangle, which gives a faster rendering of the Bezier curve by not doing unnecessary calculations.

Claims 4 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kai in view of Foley and Payne. Neither Kai nor Foley discloses splitting a quadratic Bezier curve at an inflection point. Payne discloses and claims a method of testing adjacent computed vertical coordinates to detect an inflection point in the Bezier curve and advancing the parametric variable from 0.0 toward 1.0 until an inflection point is detected, which effectively split the Bezier curve at an inflection point (column 32, lines 17 – 39). It would have been obvious to one of ordinary skills in the art at the time of the invention to combine Kai's system with Foley's teachings of the flatness test and Payne's teachings of splitting Bezier curves at its inflection points in order to compute the Bezier curve into smaller pieces, which gives a relative easier computation to the processor, even at a low memory environment.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hoel discloses a circuitry that can subdivide Bezier curves, such as cubic Bezier curves and quadratic Bezier curves (Column 16, lines 58 – 64, FIG. 9 and 11). Professor Z Sweedyk discloses steps that recursively subdivides a quadratic Bezier curve (Lecture slides 4 – 6 and 32 – 35).


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey J. Chow whose telephone number is (571)272-8078. The examiner can normally be reached on Monday - Friday 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on (703)272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JJC

  
11/18/05  
RICHARD HJERPE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600